

**Notice of Allowability**

Application No.

09/589,170

Applicant(s)

KOHNO ET AL.

Examiner

Art Unit

Jason M. Perilla

2638

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to the amendment filed May 31, 2005.
2. ☒ The allowed claim(s) is/are claims 4, 5, 10-12, and 15-18 renumbered respectively as claims 1-9.
3. ☒ The drawings filed on 08 June 2000 are accepted by the Examiner.
4. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☐ All    b) ☐ Some\*    c) ☒ None    of the:
    1. ☒ Certified copies of the priority documents have been received.
    2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.  
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
  - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
    - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
  - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

- |   |  |
|---|--|
| 1. <input type="checkbox"/> Notice of References Cited (PTO-892)  | 5. <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)                                  |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                | 6. <input checked="" type="checkbox"/> Interview Summary (PTO-413),<br>Paper No./Mail Date <u>20050808</u> . |
| 3. <input type="checkbox"/> Information Disclosure Statements (PTO-1449 or PTO/SB/08),<br>Paper No./Mail Date _____ | 7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment  |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit<br>of Biological Material          | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance                         |
|   | 9. <input type="checkbox"/> Other _____  |

### EXAMINER'S AMENDMENT

1. Claims 4, 5, 10-12, and 15-18 are pending in the instant application.
2. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Edwin Garlepp on August 8, 2005.

The application has been amended as follows wherein the following versions of claims 4, 5, 10-12, and 15-18 are replaced in their entirety:

Claim 4: A receiver that receives transmission signals transmitted in a communication system using plural frequency channels, comprising:

a phase locked loop (PLL) having an output signal being formed of differential information output means for frequency dividing an input signal in a predetermined frequency division ratio to obtain a frequency-divided signal and for outputting differential information between said frequency-divided signal and a clock pulse, filter means for outputting a differential signal voltage corresponding to said differential information, and a voltage-controlled oscillator for controlling a frequency of said output signal according to said differential signal voltage;

receiver means for receiving a transmission signal having as a ~~local oscillation~~ transmission frequency the frequency of the output signal output from said PLL;

estimation means for estimating a receiving channel corresponding to a the ~~transmission channel~~ frequency of said transmission signal; and

control means for controllably sampling a plurality of times the frequency of said output signal of said PLL from a receiving channel at one frequency to a receiving channel at another frequency when the frequency of the output signal from said PLL is set to ~~the a~~ a frequency of the receiving channel corresponding to the ~~transmission channel~~ frequency of said transmission signal,

wherein said estimation means estimates a the receiving channel corresponding to ~~a~~ the transmission ~~channel~~ frequency for said transmission signal based on ~~the~~ a received signal received by said receiver means, in the period during which said PLL samples from a the receiving channel at one frequency to a the receiving channel at another frequency, and

wherein said estimation means comprises:

a signal strength measuring circuit for measuring the signal strength of said received signal; and

an estimation circuit for estimating the signal strength measured in said signal strength measuring circuit and a the receiving channel corresponding to the transmission ~~channel~~ frequency of said transmission signal based on a hopping pattern in said receiver.

Claim 5: A receiver defined in Claim 4, wherein said estimation means comprises:

a modulation-system discriminator for discriminating ~~the~~ a modulation system of said received signal; and

an estimation circuit for estimating ~~the~~ a discrimination result by said modulation-system discriminator and the receiving channel corresponding to the transmission ~~frequency~~ channel of said transmission signal based on a the hopping pattern in said receiver.

Claim 10: A receiver that receives transmission signals transmitted in a communication system using plural frequency channels, comprising:

a phase locked loop (PLL) having an output signal being formed of differential information output means for frequency dividing an input signal in a predetermined frequency division ratio to obtain a frequency-divided signal and for outputting differential information between said frequency-divided signal and a clock pulse, ~~a first filter to which a first time constant is set, a second filter to which a second time constant slower than said first time constant is set,~~ filter means comprising a first filter to which a first time constant is set and a second filter to which a second time constant slower than said first time constant is set for outputting a differential signal voltage corresponding to said differential information, and a voltage-controlled oscillator for controlling a frequency of said output signal according to said differential signal voltage;

time-constant switching means for switching between the first and second ~~a the~~ time constants of said filter means;

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receiver means for receiving a transmission signal having as a transmission frequency the frequency of the output signal output from said PLL;

estimation means for estimating a receiving channel corresponding to a the transmission channel frequency of said transmission signal; and

control means for performing switching control such that said time-constant switching means switches from said first filter to said second filter when the frequency of the output signal from said PLL is set to the frequency of the receiving channel corresponding to the transmission channel frequency of said transmission signal and for controllably sampling a plurality of times the frequency of the output signal output from said PLL from a receiving channel at one frequency to a receiving channel at another frequency,

wherein said estimation means estimates the receiving channel corresponding to the transmission channel frequency for said transmission signal based on ~~the~~ a received signal received by said receiver means, in the period during which said second filter samples at low rate the output signal output from said PLL from a the receiving channel at one frequency to a the receiving channel at another frequency, and

wherein said estimation means comprises:

a signal strength measuring circuit for measuring a signal strength of said received signal; and

an estimation circuit for estimating the signal strength measured in said signal strength measuring circuit and the receiving channel corresponding the transmission frequency channel of said transmission signal based on a hopping pattern in said receiver.

Claim 11: A receiver that receives transmission signals transmitted in a communication system using plural frequency channels, comprising:

a phase locked loop (PLL) being formed of differential information output means for frequency dividing an input signal in a predetermined frequency division ratio to obtain a frequency-divided signal and for outputting differential information between said frequency-divided signal and a clock pulse, ~~a first filter to which a first time constant is set, a second filter to which a second time constant slower than said first time constant is set,~~ filter means comprising a first filter to which a first time constant is set and a second filter to which a second time constant slower than said first time constant is set for outputting a differential signal voltage corresponding to said differential information, and a voltage-controlled oscillator for controlling a frequency of said output signal according to said differential signal voltage;

time-constant switching means for switching between the first and second a time constants of said filter means;

receiver means for receiving a transmission signal having as a ~~local-oscillation~~ transmission frequency the frequency of the output signal output from said PLL;

estimation means for estimating a receiving channel corresponding to a the transmission ~~channel~~ frequency of said transmission signal; and

control means for performing switching control such that said time-constant switching means switches said filter means from said first filter to said second filter when the frequency of the output signal from said PLL is set to ~~the~~ a frequency of the receiving channel corresponding to the transmission ~~channel~~ frequency of said transmission signal and for controllably sampling a plurality of times the frequency of the output signal output from said PLL from a receiving channel at one frequency to a receiving channel at another frequency,

wherein said estimation means estimates the receiving channel corresponding to the transmission ~~channel~~ frequency for said transmission signal based on ~~the~~ a received signal received by said receiver means, in the period during which said second filter samples at low rate the output signal output from said PLL from a the receiving channel at one frequency to a the receiving channel at another frequency, and

wherein said estimation means comprises:

a modulation-system discriminator for discriminating a modulation system of said received signal; and

an estimation circuit for estimating a discrimination result by said modulation-system discriminator and the receiving channel corresponding to the transmission channel of said transmission signal based on a hopping pattern in said-receiver.

Claim 12: A receiver that receives transmission signals transmitted in a communication system using plural frequency channels, comprising:

a phase locked loop (PLL) being formed of differential information output means for frequency dividing an input signal in a predetermined frequency division ratio to obtain a frequency-divided signal and for outputting differential information between said frequency-divided signal and a clock pulse, filter means comprising a first filter to which a first time constant is set and a second filter to which a second time constant slower than said first time constant is set for outputting a differential signal voltage corresponding to said differential information, and a voltage-controlled oscillator for controlling a frequency of an output signal according to said differential signal voltage;

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time-constant switching means for switching between the first and second a time constants of said filter means;

receiver means for receiving a transmission signal having as a ~~local oscillation~~ transmission frequency the frequency of the output signal output from said PLL;

estimation means for estimating a receiving channel corresponding to a the transmission ~~channel~~ frequency of said transmission signal; and

control means for performing switching control such that said time-constant switching means switches said filter means from said first filter to said second filter when the frequency of the output signal from said PLL is set to ~~the~~ a frequency of the receiving channel corresponding to the transmission ~~channel~~ frequency of said transmission signal and for controllably sampling a plurality of times the frequency of the output signal output from said PLL from ~~the~~ a receiving channel at one frequency to a receiving channel at another frequency,

wherein said estimation means estimates the receiving channel corresponding to the transmission ~~channel~~ frequency for said transmission signal based on ~~the~~ a received signal received by said receiver means, in the period during which said second filter changes at low rate the output signal output from said PLL from a the receiving channel at one frequency to a the receiving channel at another frequency, and

wherein said estimation means comprises:

a signal strength measuring circuit for measuring the signal strength of said received signal;

a modulation-system discriminator for discriminating ~~the~~ a modulation system of said received signal; and

an estimation circuit for estimating the signal strength measured by said signal strength measuring circuit, ~~the~~ a discrimination result of said modulation-system discriminator, and the receiving channel corresponding to the transmission ~~channel~~ frequency of said transmission signal based on a hopping pattern in said receiver.

Claim 15: A receiver that receives transmission signals transmitted in a communication system using plural frequency channels, comprising:

a plurality of receiving antennas for receiving said transmission signals;

a switching circuit for selectively switching outputs from said plurality of receiving antennas in a time-division mode to output received signals;

a phase locked loop (PLL) for outputting frequency-controlled output signals;

receiver means for receiving a received signal from said switching circuit using as a local oscillation signal an output signal output from said PLL;

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estimation means for estimating a receiving channel corresponding to a transmission frequency channel of a transmission signal; and

control means for controllably sampling ~~the a~~ frequency of said output signal from said PLL, from a receiving channel at one frequency to a receiving channel at another frequency when the frequency of the output signal from said PLL is set to a local oscillation frequency ~~according to the receiving channel~~ corresponding to the transmission frequency channel for said transmission signal;

wherein said estimation means includes a signal strength measuring circuit for measuring a signal strength of said received signal every unit period during which each of said plurality of receiving antennas is selected and then synthesizing said signal strengths over said unit period;

said estimation means estimating the receiving channel corresponding to the transmission frequency channel for said transmission signal based on a synthesized signal strength in the period during which the frequency of said output signal from said PLL is sampled to between a local-oscillation frequency corresponding to the receiving channel at one frequency and the receiving channel at another frequency.

Claim 16: A receiver that receives transmission signals transmitted in a communication system using plural frequency channels, comprising:

a plurality of receiving antennas for receiving said transmission signals;

a switching circuit for selectively switching outputs from said plurality of receiving antennas in a time-division mode to output a received signal;

a phase locked loop (PLL) for outputting frequency-controlled output signals, said PLL including a loop filter;

receiver means for receiving a received signal from said switching circuit, using as a local oscillation signal an output signal output from said PLL;

estimation means for estimating a receiving channel corresponding to a transmission frequency channel of a transmission signal; and

control means for switching a time constant of said loop filter when a frequency of the output signal from said PLL is set to ~~a the local-oscillation frequency according to the receiving channel~~ corresponding to the transmission frequency channel of said transmission signal and controllably sampling the frequency of said output signal from said PLL, from a receiving channel at one frequency to a receiving channel at another frequency;

wherein said estimation means includes a signal strength measuring means for measuring a signal strength of said received signal every unit selection period during

which an output of each of said plurality of receiving antennas is selected, and synthesizing said signal strengths over said unit selection period;

said estimation means estimating the receiving channel corresponding to the transmission ~~frequency channel~~ for said transmission signal based on a signal strength synthesized in the period during which said switched time constant loop filter changes the frequency of said output signal from said PLL, from a ~~local oscillation~~ frequency corresponding to the receiving channel at one frequency to the receiving channel at another frequency.

Claim 17 (Original): A receiver defined in Claim 15 or 16, wherein said communication system comprises a frequency hopping system for spread spectrum communication.

Claim 18 (Currently Amended): A receiver defined in Claim 17, wherein said estimation means ~~circuit~~ estimates the receiving channel corresponding to the transmission channel for said transmission ~~channel~~ signal based on said signal strength synthesized and a hopping pattern in said frequency hopping system.

**Claims 4, 5, 10-12, and 15-18 are renumbered as claims 1-9, and the claim dependency is renumbered accordingly.**

***Allowable Subject Matter***

3. Claims 4, 5, 10-12, and 15-18 renumbered respectively as claims 1-9 are allowed.

4. The following is an examiner's statement of reasons for allowance:

Claims 4, 5, 10-12, and 15-18 renumbered respectively as claims 1-9 are allowed because the prior art of record does not disclose or obviate all of the claimed features. Specifically, the prior art does not disclose a frequency hopping spread spectrum receiver wherein a (hopping) frequency position of a transmission to be received is



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determined by sweeping all of the possible frequencies of the transmission a plurality of times and using a signal strength measuring circuit and/or an estimation circuit to make a final determination on the signal to be received according to a hopping pattern (stored in the received) of transmissions observed during the sweeping all of the possible frequencies.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."


### ***Conclusion***

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason M. Perilla whose telephone number is (571) 272-3055. The examiner can normally be reached on M-F 8-5 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kenneth Vanderpuye can be reached on (571) 272-3078. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

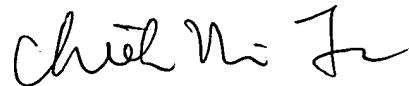
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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Jason M. Perilla  
August 8, 2005

jmp



**CHIEH M. FAN**  
**PRIMARY EXAMINER**